

Keysight Technologies L4433A Dual/Quad 4x8 Reed Matrix

Data Sheet

- LXI compliance includes built-in Ethernet connectivity
- Fully-featured graphical web interface
- Dual 4x8, 8x8, or 4x16 2-wire configurations
- 64 2-wire or 128 1-wire cross points
- High speed reed relays
- Analog bus connection
- Relay counter
- ± 150 V peak, 0.5 A switch, 1.5 A carry current
- Software drivers for most common programming environments





Introduction

Dual/quad 4x8 Matrix offers high performance signal switching

The Keysight L4433A is a high-speed reed relay matrix that is LXI Class C compliant. With its small size and Ethernet connectivity, this matrix can be placed wherever your application needs it.

The Keysight L4433A offers a flexible connection path between your device under test (DUT) and your test equipment, allowing different instruments to be connected to multiple points on your DUT at the same time. This instrument can be configured as a 2-wire or a 1-wire matrix, increasing the number of cross points. Multiple matrices can be combined through the analog buses connector to create a larger matrix.

Using this LXI instrument, you'll get all the benefits of an Ethernet connection, instrument web server, standard software drivers and more. The LXI standard is supported by multiple vendors, enabling lower cost of test with accelerated test integration and development.

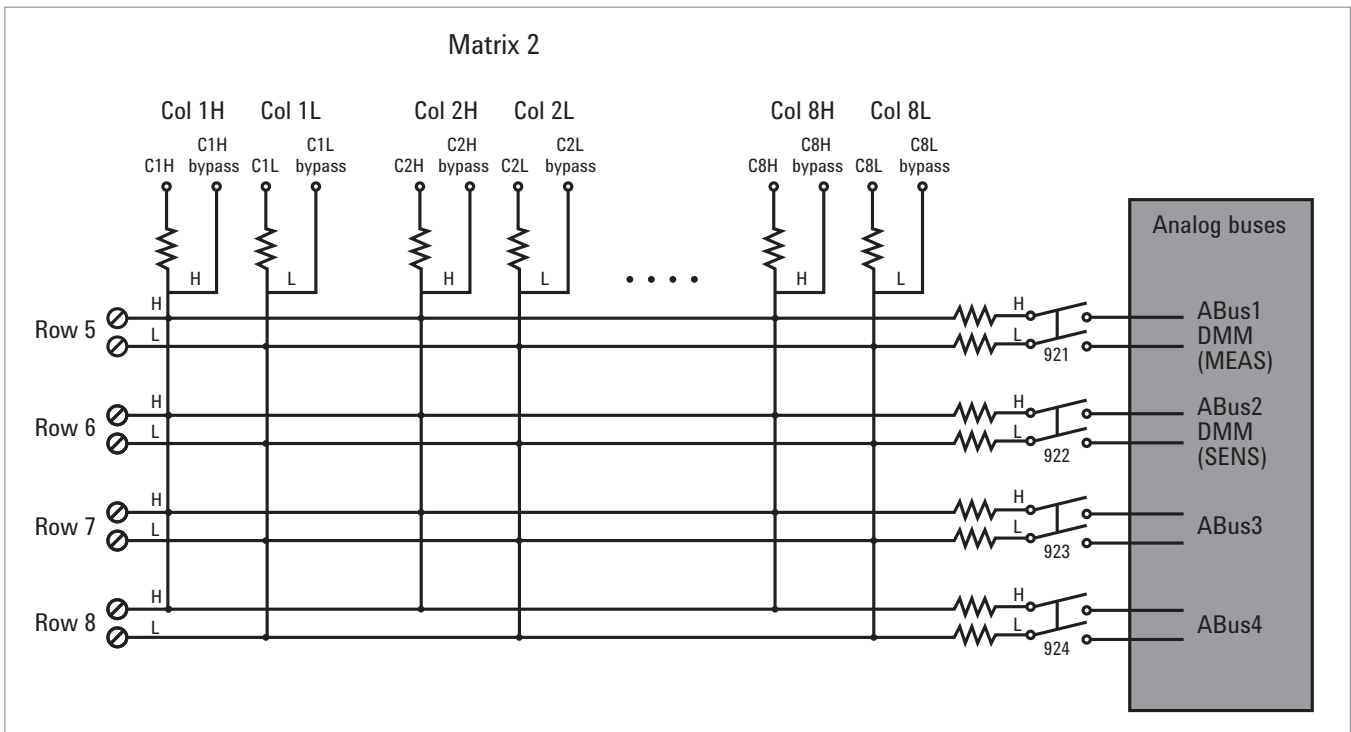


Figure 1. L4433A Dual/Quad 4 x 8 Real Matrix.

Switch features for flexible and reliable connections

The L4433A features a full cross point matrix that allows you to connect any row to any column. This is a convenient way to connect multiple test instruments to multiple points on a DUT. With its high-speed reed relays you will get a fast response.

Each cross point in the matrix switch has two wires - high and low - for the measurement. Or, if you prefer, you can configure the L4433A as a single wire matrix, increasing the number of cross points to 128. The L4433A also has in-rush resistors on each column for added protection. Expand your matrix using the analog bus connector to create a larger matrix, or easily connect to an external measurement device like a DMM.

The sequence feature defines switch closures and controls and can be used to easily change to different switch setups. Simply assign a sequence,

give it a name and then execute it with the custom name you created.

External trigger capabilities make it easy for you to time and synchronize switch closures and openings.

The L4433A also includes a relay counter to monitor and help you determine when relays are nearing their end of life.

Easily route signals to an external DMM

The L4433A switches support signals up to ±150 V and 0.5 A so that no external signal conditioning is required. The analog bus connector can be used to easily route your matrix switch signals to an external device.

System connections you can trust

The L4433A comes with two heavy duty 50-pin Dsub connectors that provide simple, reliable connection options. Each connector uses 30 micro

inches of gold to ensure repeatable and accurate measurements. Other connection options include:

- Detachable terminal blocks with strain relief
- Low-cost, standard 50-pin Dsub connector kits and cables
- Mass interconnect solutions

Ethernet connectivity enables simple connection to the network and remote access to measurements

The Ethernet interface offers high-speed connections for remote access and control. You can set up a private network to filter out unwanted LAN traffic and speed up the I/O throughput, or take advantage of the remote capabilities and distribute your tests worldwide. Monitor, troubleshoot, or debug your application remotely. Ethernet communication also can be used with the support of LAN sockets connections.

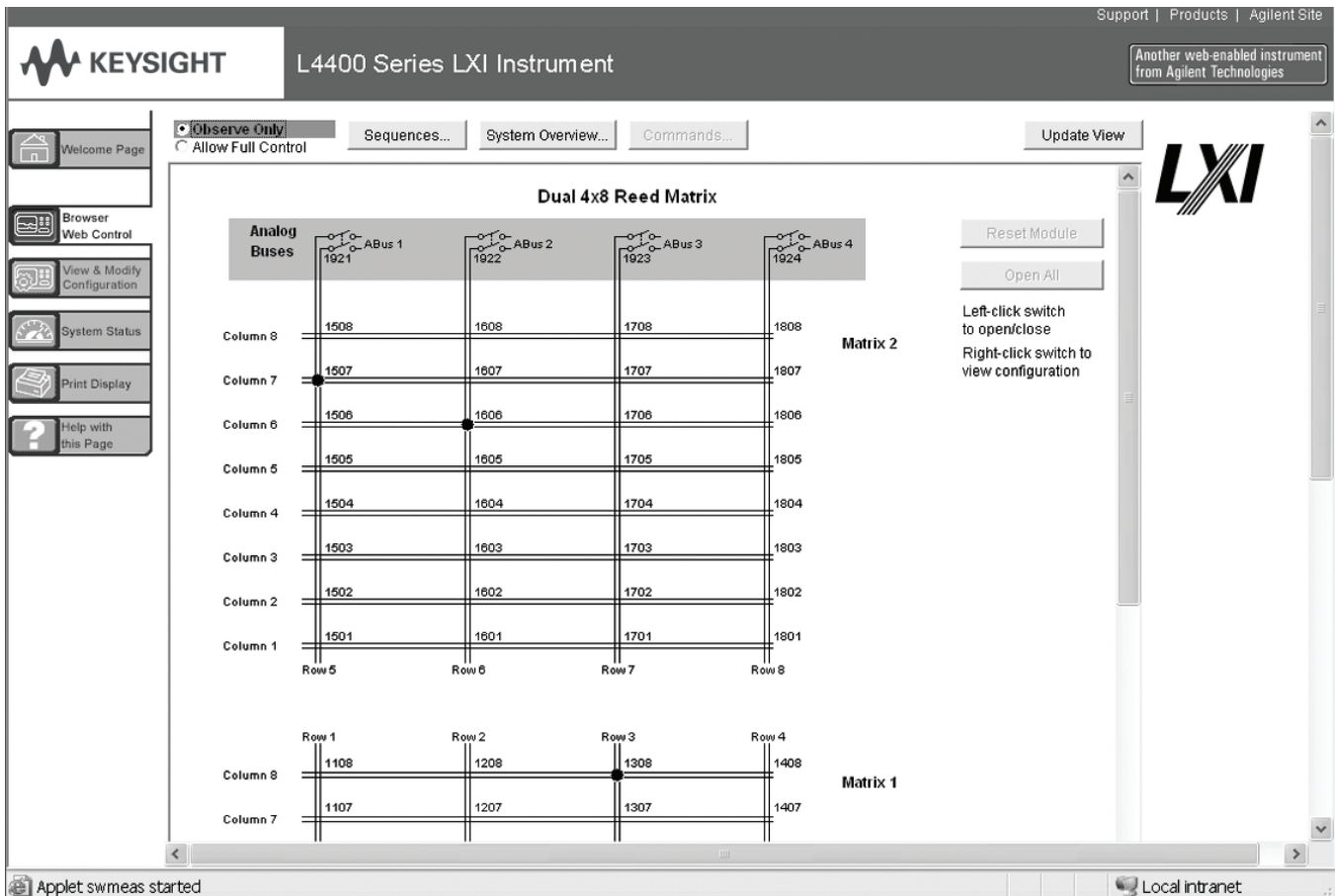


Figure 2. The Web interface makes it easy to set up, troubleshoot and maintain your test remotely.

The optional GPIB interface has many years of proven reliability and can be used for easy integration into existing applications.

The L4433A ships with the Keysight E2094N I/O Libraries Suite, which enables connections for Keysight and non-Keysight modular and traditional instruments. This makes it easy for you to configure and integrate instruments into your system.

Fully featured graphical web interface makes it easy to set up and troubleshoot your tests from anywhere in the world

The built-in web server provides remote access and control of the instrument via a Java-enabled browser such as Internet Explorer. Using the web server, you can set up, troubleshoot, and monitor your instrument from remote locations.

- View and modify instrument setup
- Open or close switches
- Send, receive or view SCPI commands
- Define and execute switch sequences
- View error queue
- Get status reports on relay counts, firmware revisions, and more

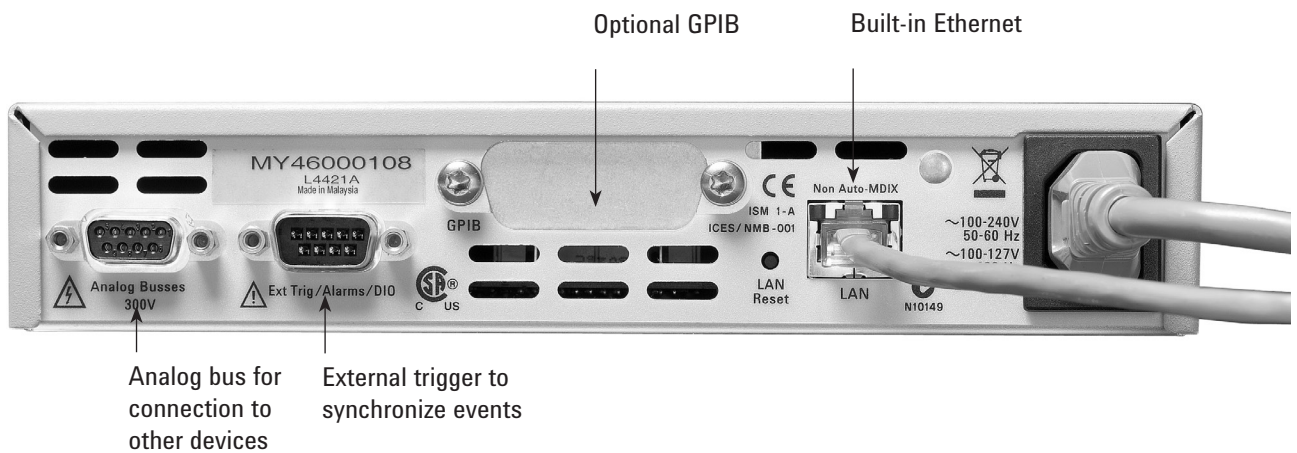
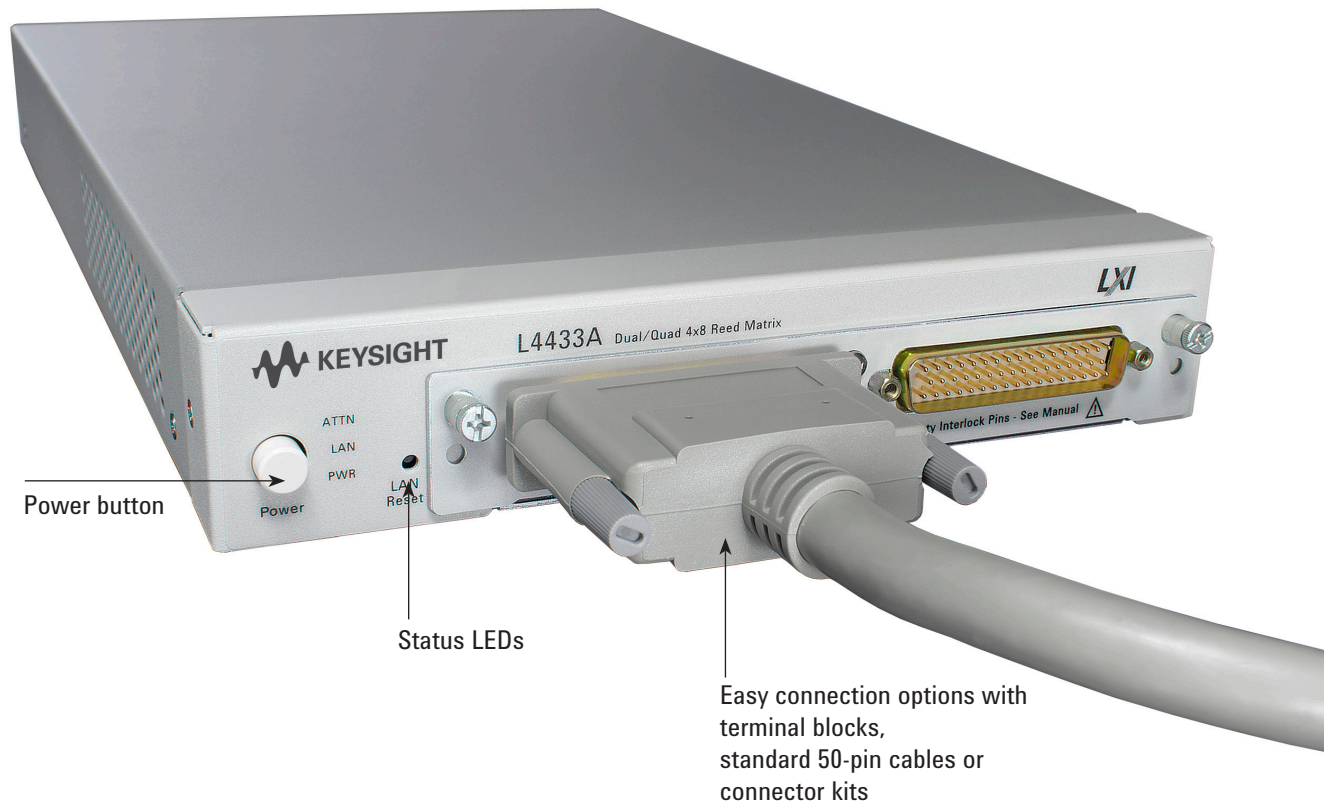
Additionally, since the web server is built into the instrument, you can access it on any operating system that supports a web browser without having to install special software. Password protection and LAN lockout are also provided to limit access for additional security.

Software for most popular programming environments

Full support for standard programming environments ensures compatibility and efficiency. You can use direct I/O with your own software, or use standard IVI and LabVIEW software drivers that provide compatibility with the most popular development environments:

- Keysight VEE Pro
- National Instruments LabVIEW, LabWindows/CVI, TestStand, and Switch Manager
- Microsoft C/C++ and Visual Basic

High-performance switching wherever your application needs it



Product specifications

Specifications and characteristics		
Channels/configurations		dual 4x8 8x8, 4x16 quad 4x8, 1-wire
Switch type		Reed non-latching
Input characteristics (per channel)		
Max volts ¹		± 150 V peak ²
Max current (DC, AC RMS)	Switch current	0.5 A ⁵ / 0.05 A ⁸
	Carry current	1.5 A ⁵ / 0.05 A ⁸
Power (W, VA) ^{2,6}		10 W ⁷
Volt-Hertz limit		10 ⁸
Initial closed channel resistance ^{3,9}		< 1.5 Ω ⁵ / 200 Ω ⁸ <i>nominal</i>
General specifications		
DC Isolation (ch-ch, ch-earth)		>10 GΩ
Offset voltage ³		<50 μV < 100 μV 1-wire
AC characteristics		
Bandwidth at terminal block ⁴		30 MHz ⁵ / 4 MHz ⁸ 2 MHz 1-wire
Crosstalk at terminal block (ch-ch) ⁴	300 kHz	-65 dB
	1 MHz	-65 dB
	20 MHz	-40 dB
Capacitance at terminal block	HI-LO	80 pF
	LO – earth	75 pF
General characteristics		
Relay life typical	No load	1000 M
	10 V, 100 mA	10 M
	Rated load	10 k
Open / close time, typical		0.5 ms / 0.5 ms
Analog bus connection		Yes

¹ DC or AC RMS voltage, channel-to-channel or channel-to-earth

² Peak voltage, channel-to-channel or channel-to-earth

³ Into analog bus connector

⁴ 50 Ohm source, 50 Ohm load, differential measurements verified (Sdd21)

⁵ With input resistors bypassed. Bypassing resistors will reduce lifetime of relays. See the rated load relay life characteristics.

⁶ Limited to 6 W channel resistance power loss per module

⁷ Power restrictions allow only 20 channels to be closed at one time

⁸ With 100 Ohm input protection resistors

⁹ Channel resistance is typically < 1.5 Ω but can go as high as 50 Ω when a channel is used in measurement applications with < 10 mA load current. Increased relay channel resistance for measurements with load currents below 10 mA can occur on cards that have been out of service or following relay inactivity for periods of greater than 1 week. Switching relays for 2K cycles prior to use may reduce the variation in channel resistance. Applies to the 34931A and 34932A. Keysight recommends the use of 4-wire Ohms for resistance measurements. For high accuracy voltage measurements, select the DMM input resistance setting of > 10 G ohms to minimize the impact of relay contact resistance.

Measurement Accuracy For accuracy measurement specification, combine the DMM offset with the switch offset.

Bandwidth of the switch may offset the accuracy of the AC measurement.

Product specifications (continued)

General system specifications	
Power supply	Universal 100 V to 240 V \pm 10%
Power line frequency	50 Hz to 60 Hz \pm 10% automatically sensed
Power consumption	15 VA
Operating environment	Full accuracy for 0°C to 55°C Full accuracy to 80% R.H. at 40 °C Pollution degree 1 of IEC 61010-1
Storage environment	-40°C to 70°C
Dimensions (H x W x L)	40.9 x 212.3 x 379.3 mm 1.61 x 8.36 x 14.93 in
Weight	3.9 kg, 8.6 lbs
Safety conforms to	CSA, UL/IEC/EN 61010-1
EMC conforms to	IEC/EN 61326-1, CISPR 11
Warranty	3 years
Memory	
States	5 instrument states with user label in non-volatile memory
Software	
Keysight connectivity software included	Keysight I/O Libraries Suite version 14 or greater (E2094N)
Minimum system requirements	
PC hardware	Intel Pentium 100 MHz, 64 Mbyte RAM, 210 Mbyte disk space Display 800x600, 256 colors, CD-ROM drive
Operating system ¹	Windows 98 SE/NT/2000/XP
Computer interfaces	
	Standard LAN 10BaseT/100BaseTx Optional IEEE 488.2 GPIB
Software driver support for programming languages	
Software drivers	IVI-C and IVI-COM for Windows NT/2000/XP, LabVIEW
Keysight	VEE Pro
National Instruments	TestStand, Measurement Studio, LabWindows/CVI, LabVIEW, Switch Executive
Microsoft	C/C++, Visual Basic 6, Visual Studio, .NET

¹ Load I/O Libraries Version M for Windows NT support or version 14.0 for Windows 98 SE support

Ordering information

L4433A Dual/quad 4x8 Reed Matrix

Includes User's guide on CD, power cord, and Quick Start package

Option GPIB

Adds GPIB interface

Option 0B0

Deletes printed manual set, full documentation included on CD ROM

Option ABA

English printed manual set

Connection Options

Select terminal block for discrete wiring, cables or connector kits. Cables and connector kits require 2 per instrument.

34933T

Terminal block for 34933A and L4433A dual 4x8 Matrix

Y1135A

1.5 m 50-pin Dsub, M/F twisted pair with outer shield cable – 300 V

Y1136A

3 m 50-pin Dsub, M/F twisted pair with outer shield cable – 300 V

Y1139A

Solder cup connector kit with female 50-pin Dsub

Other accessories

Y1160A

Rack mount kit for L4400 series instruments-racks 2 instruments side-by-side with sliding tray

Note: when using the L4400 series rack mount kit, use the Y1139A solder cup connector kit rather than the 34921T terminal block.

For additional information please visit:
<http://www.keysight.com/find/L4433A>

Related literature

Data sheets

5988-6302EN, *Keysight VEE Pro*

5989-1439EN, *Keysight E2094N I/O Libraries Suite 15.5*

myKeysight

www.keysight.com/find/mykeysight

A personalized view into the information most relevant to you.

www.axistandard.org

AdvancedTCA® Extensions for Instrumentation and Test (AXIe) is an open standard that extends the AdvancedTCA for general purpose and semiconductor test. Keysight is a founding member of the AXIe consortium.



www.lxistandard.org

LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Keysight is a founding member of the LXI consortium.



www.pxisa.org

PCI eXtensions for Instrumentation (PXI) modular instrumentation delivers a rugged, PC-based high-performance measurement and automation system.



Three-Year Warranty

www.keysight.com/find/ThreeYearWarranty

Beyond product specification, changing the ownership experience.

Keysight is the only test and measurement company that offers three-year warranty on all instruments, worldwide.



www.keysight.com/quality

Keysight Electronic Measurement Group

DEKRA Certified ISO 9001:2008

Quality Management System



Keysight Channel Partners

www.keysight.com/find/channelpartners

Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

Americas

Canada	(877) 894 4414
Brazil	55 11 33 51 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 375 8100

Europe & Middle East

Belgium	32 (0) 2 404 93 40
Denmark	45 45 80 12 15
Finland	358 (0) 10 855 2100
France	0825 010 700* *0.125 €/minute
Germany	49 (0) 7031 464 6333
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
United Kingdom	44 (0) 118 927 6201

For other unlisted countries:

www.keysight.com/find/contactus

(BP-04-10-14)